REMARKS

Reconsideration of the subject application is respectfully requested.

As explained, for example, in paragraphs 0011, 0031 and 0036 of the published version of the subject application, configuring or fashioning the "distribution" of the magnetic flux density provided by the magnet sources of the field assembly of an actuator to take into account expected load and other characteristics can simplify the actuator design. In particular, it may be possible to substantially reduce or eliminate the need to apply or to control the current applied to the coil assembly of the actuator in order to obtain desired force versus stroke characteristics for the actuator. Paragraphs 0032 through 0035 provide an example where the sizing and distribution of adjacent magnets of the same polarity in the field assembly are selected so that a stroke versus force pattern for the actuator can be obtained which closely matches the load characteristics of a spring.

As recited in independent claims 1, 10, 14, and 32, the magnet sources of the field assembly are configured or arranged to provide distributions of flux density in the air gap related to the characteristics of a load. Independent claims 19, 24, and 28 are directed to the use of consecutive or adjacent magnets of the same polarity, followed along the direction of motion by consecutive or adjacent magnets of a different polarity. These magnets will then provide a flux density distribution in the air gap which related to the sizing and distribution of the magnets along the direction of motion.

Pending claims:

Claims 1-40 are pending in the subject application. The independent claims are claims 1, 10, 14, 19, 24, 28 and 32. Claims 32 through 40 are method claims.

Rejection under 35 USC 112, Second Paragraph:

The Examiner has rejected claims 5, 9, 11, 12, and 15-17 under 35 USC 112, second paragraph, as indefinite. Applicant respectfully traverses these rejections.

As to claims 5 and 17, the Examiner has taken the position that the meaning of "the load characteristics correspond to a spring having a spring constant K" is unclear "since every load can be represented as a spring having a spring constant K." While the Examiner has taken a theoretical position that any load can be represented as a spring having a spring constant K, presumably because for loads which do not exhibit spring-like characteristics, the spring constant K could be set accordingly, for example to zero, the quoted claim passage plainly

refers to the load being a spring in the ordinary sense, and not to the modeling of any load as a spring. For example, according to the ASME, "[a] mechanical spring is defined as an elastic body whose mechanical function is to store energy when deflected by a force and to return the equivalent amount of energy upon being release, or portions thereof, see ANSI Y14.6-1978."

As to claims 9, 11, 12, 15 and 16, the Examiner has asserted that it is "unclear what the function of friction characteristics represents 'wherein the first plurality of magnets is further configured to provide a flux density distribution in the air gap as a function of friction characteristics'." As is plain from the words used in the quoted claim passage, "friction characteristics" are to be taken into account in configuring the magnet field sources and thereby the resulting flux density distribution in the gap. Thus, for example, as explained in paragraph 0036 of the published version of the subject application, "[p]referably, the magnetic field distribution in the air gap provided by the permanent magnets matches the expected load and *friction characteristics* as closely as possible." (Emphasis added.) In paragraph 0032, it is stated "[f]or example, in the embodiment of the present invention depicted in Fig. 2A, the sizing and distribution of the magnets 22A/22B, 32A/32B, 34A/34B and 36A/36B, are selected to match a particular load, namely, a spring having a spring constant K, and the *frictional forces* expected to be present in the actuator." (Emphasis added.)

In order to clarify what is meant by "function of friction characteristics" in claim 9 and 39, claim 9 has been amended to add "of the actuator" at the end of the claim, and claim 39 has been amended to read "friction characteristics of the actuator or load." Support for these amendments can be found at paragraphs 0032 and 0036 of the published version of the subject application.

It is therefore respectfully submitted that the above passages are definite.

Rejection under 35 USC 102(b) -- Aoyama et al.:

The Examiner has rejected claims 1-12, 14-17, 24 and 26-31 under 35 USC 102(b) as being anticipated by Aoyama et al., USP 5,808,381. Applicant respectfully traverses this rejection.

As understood by Applicant, Aoyama et al. disclose a linear motor in which a driving circuit, supplying sinusoidal current to the coils, changes the current supplied to each coil to provide "certain thrust forces." *See*, for example, col. 5, line 59 through col. 6, line 4; col. 2, lines 45-56; and col. 10, lines 35-37. Thus, Aoyama et al. is like the conventional linear actuators described in paragraph 0004 of the published subject application, in which desired

force versus stoke characteristics are obtained by controlling the current being supplied to the coil or coils.

Moreover, there is no discussion in Aoyama et al. about configuring the magnets to provide flux density distributions that are selected as a function of the load characteristics, such as recited in independent claim 1. Contrary to the Examiner's assertions, there is no discussion in Aoyama et al. of a correlation of the particular magnet configuration and flux density distribution to the characteristics of the particular load. Thus, Aoyama et al. do not disclose the use of distributed magnet field sources which provide a flux density distribution corresponding to the load characteristics, as in independent claim 10.

Further, Aoyama et al. do not disclose, as is recited in independent claim 14, a plurality of magnets arranged in a sequence so that *at least two adjacent magnets having a first polarity* are followed by at least another of the plurality of magnets having a polarity different from the first polarity. While the Examiner has pointed to magnets [1, and figure 3] in Aoyama et al. as meeting this feature, it is clear that those magnets alternate in polarity from one magnet to the next, so that a NSNS pattern is provided. Clearly, Aoyama et al. do not disclose "at least two adjacent magnets" of a first polarity. Nor do Aoyama et al. disclose the provision that "flux distributions . . . provided by the sequence correspond to the load characteristics," as is recited in claim 14.

As to independent claim 24, the Examiner has again pointed to magnets [1, and figure 3] in Aoyama et al. as meeting the feature of "a first sequence of magnets of one polarity followed in the direction of motion by a second sequence of magnets of a different polarity." It is respectfully submitted that Aoyama et al.'s NSNS pattern of magnets is not a first sequence of magnets of one polarity followed by a second sequence of magnets of a different polarity.

For claim 28, the Examiner again points to magnets [1] of Aoyama et al. as satisfying the feature of "consecutive groups of magnets, each one of the consecutive groups of magnets including a plurality of magnets arranged to have a selected magnetic polarity." As noted above, Aoyama et al.'s magnets are arranged in an NSNS pattern, which is clearly not a plurality of magnets arranged to have a selected polarity.

For these reasons, it is respectfully submitted that independent claims 1, 10, 14, 24 and 28 are allowable over Aoyama et al.. Further, it is respectfully submitted that claims 2-9 as dependent from allowable claim 1, claims 11-12 as dependent from allowable claim 10, claims

15-17 as dependent from allowable claim 14, claims 26-27 as dependent from allowable claim 24, and claims 29-31 as dependent from allowable claim 28, are also allowable.

Rejection under 35 USC 102(e) – Floresta et al.:

The Examiner has rejected claims 19-23 as being anticipated under 35 USC 102(e) by Floresta et al., USP 6,239,516. Applicant respectfully traverses this rejection.

As understood by Applicant, Floresta et al. discloses a linear motor with a NSNS magnet arrangement.

It is respectfully submitted that Floresta et al.'s NSNS magnet arrangement cannot be said to meet the claim 19 feature of "a first plurality of magnets of one polarity followed by a second plurality of magnets of a different polarity." Floresta et al. clearly disclose one magnet of N polarity followed by one magnet of S polarity, in an alternating fashion, and clearly do not disclose a "first plurality of magnets of one polarity" followed by "a second plurality of magnets of a different polarity." For this reason it is respectfully submitted that claim 19 is allowable over Floresta, et al., and dependent claims as dependent from allowable independent claim 19, are also allowable over Floresta, et al.

Rejection under 35 USC 103:

The Examiner has rejected claims 13, 18, 25 and 32-40 under 35 USC 103(a) as being unpatentable over Aoyama et al. USP 5,808,381. Applicant respectfully traverses this rejection.

The Examiner has taken the position that although Aoyama et al. does not disclose altering the dimensions of the magnetic field sources, it would have been obvious to do so, "since applicant has not disclosed that altering the magnetic field solves any stated problem or is for any purpose and it appears that the invention would perform equally well with a uniform magnetic field." As pointed out above, in the published version of the subject application, in at least paragraphs 0011, 0031 and 0036, there is a discussion that by configuring or fashioning the "distribution" of the magnetic flux density provided by the magnet sources of the field assembly of an actuator to take into account expected load and other characteristics the result can be a substantial reduction of the need to apply or control the current applied to the coil assembly of the actuator in order to obtain desired force versus stroke characteristics for the actuator. Paragraphs 0032 through 0035 provide an example where the sizing and distribution of adjacent magnets of the same polarity in the field assembly are selected so that a stroke versus force pattern for the actuator can be obtained which closely matches the load

characteristics of a spring. Thus, through the claimed invention the design of the actuator can be simplified and the complexities of controlling the coil current to obtain a desired force characteristic can be reduced, over that of an actuator with a uniform magnetic field. *See* paragraph 0031. Accordingly, claims 113, 18, 25 and 32-40 are unobvious over Aoyama et al.

Double Patenting Rejection:

The Examiner has rejected claims 1-40 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 6,787,943, asserting that the conflicting claims although not identical, disclose the same linear motor structure, and are therefore not patentably distinct from each other. Applicant respectfully traverses this rejection. As explained above, the claims of the subject application are directed to configuring the magnet field sources to correspond to the expected load characteristics and other factors, and/or the use of consecutive or adjacent magnets of the same polarity, followed along the direction of motion by consecutive or adjacent magnets of a different polarity. In contrast, the claims of the '943 patent do not recite such features. Accordingly, the claims of the subject application are patentably distinct from the claims of the '943 patent.

Amendment to Claim 33:

Claim 33 has been amended to correct a typographical error, so that the passage in "dimensioning first and second magnets" step now reads: "a second average flux density of the selected polarity." Support for this amendment can be found from the context of that passage within claim 33 as a whole, as well as from Fig. 2A of the subject application, for example, in which two magnets of the same polarity but of differing flux densities are shown grouped together.

Conclusion:

For at least the foregoing reasons it is respectfully submitted that the subject application is in condition for allowance, and the Examiner's indication to that end is respectfully solicited.

The Commissioner is hereby authorized to charge any fees that may be associated with this communication to Deposit Account No. 07-1896.

Respectfully submitted,

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Date: December 28, 2005 By: 

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